

Remarks:

This amendment is submitted in an earnest effort to advance this case to issue without delay.

Claim 1 has been amended in order to improve the clarity of the claim and to define the instant invention with somewhat greater particularity over the combination of US patent 6,313,934 of Fortenberry and French patent 2,601,134 of Pellaux.

Claims 1 - 6 stand rejected under §103(a) as "being unpatentable over Fortenberry (6313,934) in view of Pellaux et al (FR 2 601 134)". More specifically, with respect to claims 1,5, the Examiner asserts that "Fortenberry discloses an apparatus for measuring the chromatic dispersion of an optical system. The apparatus comprises: an optical source 16 (FIG. 1) able to generate optical signals at variable wavelength (tunable laser); a signal generator able to generate modulation signals 3 (FIG. 1); a modulator 14 (FIG. 1) able to generate modulated optical signals 7 (FIG. 1) on the basis of said optical signals 5 (FIG. 1) and of said modulation signals 3 (FIG. 1); sending the modulated optical signals to a first end of said optical system 11 (FIG. 1); comparison means for measuring a phase difference between the modulated signals 3 (FIG. 1) and the return signals 9 (FIG. 1)."

The Examiner admits that "Fortenberry does not disclose the claimed coupler, the mirror at the end of the further end of the fiber and the impulsive electrical signals."

To fill in this gap, the Examiner cites Pellaux in an attempt to remedy the deficiencies of Fortenberry. The Examiner asserts that "Pellaux discloses a system for measuring chromatic dispersion of a fiber. The system comprises: a coupler 30 (FIG. 2), a mirror 41 (FIG. 1) at the further end of the fiber 33 (FIG. 2)." The Examiner further states that "Fortenberry discloses an embodiment using amplitude modulated pulse signals (column 3, lines 14-16), " reaching the conclusion that "[i]t would have been obvious to modify Fortenberry with the coupler and the mirror taught by Pellaux and the amplitude-modulated pulse signals taught by Fortenberry in column 3, lines 14-16 to measure the chromatic dispersion using only one end of the fiber to facilitate the measuring. Further, it would have been obvious to modify Fortenberry with the claimed impulsive electrical signals to use the system for measuring different types of fiber."

Applicants respectfully traverse as the Examiner has not and cannot make a prima facie showing of obviousness.

In order to establish a prima facie case of obviousness, the Examiner must show, among other things, that the reference or combination of references teaches or suggests each and every element and limitation recited in the claims (see MPEP. § 2143.03). Amended claim 1 recites impulsive electrical signals having variable amplitude, and having duration and periodicity determined according to the characteristics of the fiber under test, such that the modulated optical signals are shaped by pulses having their amplitude variable (specification, page 5, lines 9-11).

Neither Fortenberry nor Pellaux teach or suggest using impulsive electrical signals having variable amplitude that meet all of the claim limitations, and thus, cannot be used to establish a prima facie case of obviousness over claims 1-6. Fortenberry teaches (col. 3, lines 14-16) "[...] the optical test signals are amplitude modulated. Alternatively, other types of modulation is performed, such as pulse or frequency modulation." (emphasis added). Thus, Fortenberry does not teach impulsive electrical signals having variable amplitude, such that the modulated optical signals are shaped by pulses having their amplitude variable. Similarly, Pellaux does not teach impulsive electrical signals having variable amplitude.

To establish a prima facie case of obviousness under §103, one must establish two additional requirements. First, show that some suggestion or motivation exists, either in the references themselves, or in the knowledge generally available to one of ordinary skill in the art, to modify the reference or to combine reference teachings to achieve the presently claimed invention (See MPEP. § 2143.01). Second, one must establish a reasonable expectation of success for the proposed combination (See MPEP §2143.02).

Fortenberry discloses an apparatus for measuring the chromatic dispersion according to the phase-shift technique, wherein the optical phase of the reference signal is compared to that of the measurement signal (column 3, lines 30-45). On the contrary, Pellaux discloses (FIG. 2) an apparatus for measuring the chromatic dispersion according to the interferometric technique (page 2 thereof), which is a technique alternative to, and

substantially different from, the phase-shift technique. In particular, the optical radiation injected into the fiber under test is typically a continuous wave optical radiation and the coupler (30) of Pellaux's apparatus (FIG. 2) has the main effect of making interfere two optical radiations, one coming from the fiber under test and the other from the reference line. It is well established that the mere fact that references can be combined does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination/modification (MPEP §2143.01). Since the techniques disclosed in the two cited documents are alternative techniques for measuring the chromatic dispersion of a fiber, a skilled person would have used one or the other, not both. The Examiner offers no basis for why a person of ordinary skill in the art would combine these two documents, nor any indication of why the combination is desirable, as required by MPEP. §2143.01.

Furthermore, even if a skilled person tries to combine Fortenberry with Pellaux, there is no indication of how the skilled person would have combined the references, i.e. which elements the skilled person would have picked from the two documents.

Accordingly, this rejection is in error and Applicants respectfully request its withdrawal.

Moreover, even if a skilled person tries to use the coupler and the mirror taught by Pellaux in the apparatus disclosed by Fortenberry in FIG. 1, the resulting apparatus would not be suitable to measure the chromatic dispersion of an optical fiber by

the phase-shift technique accessing only one end of the fiber itself.

According to Fortenberry, (column 3, lines 15-16) "the optical test signals are amplitude modulated. Alternatively, other types of modulation are performed, such as pulse or frequency modulation.". It such be noted that such modulation is needed in order to use the phase-shift technique, more particularly in order to compare the optical phase of the reference signal and that of the measurement signal (column 3, lines 30-45). However, nothing in Fortenberry (or in Pellaux) suggests that the modulated optical signals are shaped by pulses having their amplitude variable (specification, page 5, lines 9-11). Accordingly, the apparatus resulting from the combination of Fortenberry and Pellaux would present the problem that the modulated optical signals reflected by the first end of the fiber under test (or any intermediate connectors between the first end and the second end) would interfere at the comparator with the reflected optical signal coming from the second end of the fiber, thus degrading unacceptably the measurement.

On the other end, the apparatus and the method according to applicant's invention provide modulated optical signals shaped by pulses having their amplitude variable, the amplitude variation of the pulses being used for phase comparison according to the phase-shift technique and the pulses themselves being used to solve the interference problem at the comparison means (page 7 of specification lines 1-8).

Claim 2 and 5 have been amended in order to improve their clarity.

Claim 4 has been amended to overcome the objection and in order to improve its clarity.

Claim 6 has been amended by adding the word "fiber" that seems to be missing in the claim as filed.

Claims 7 to 9, dependent on method claim 5, have been newly added to cover preferred embodiments of the invention.


Claims 10 to 11, dependent on apparatus claim 1, have been newly added to cover preferred embodiments of the invention.

For these reasons all the claims are felt to be in condition for allowance. Notice to that effect is earnestly solicited.

If only minor problems that could be corrected by means of a telephone conference stand in the way of allowance of this

case, the examiner is invited to call the undersigned to make the necessary corrections.

Respectfully submitted,
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Enclosure: None.